

# Breast Imaging Center studying use of AI in same-day exams

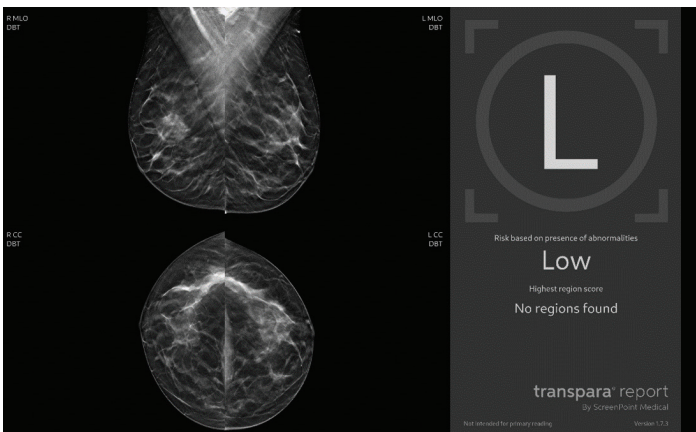


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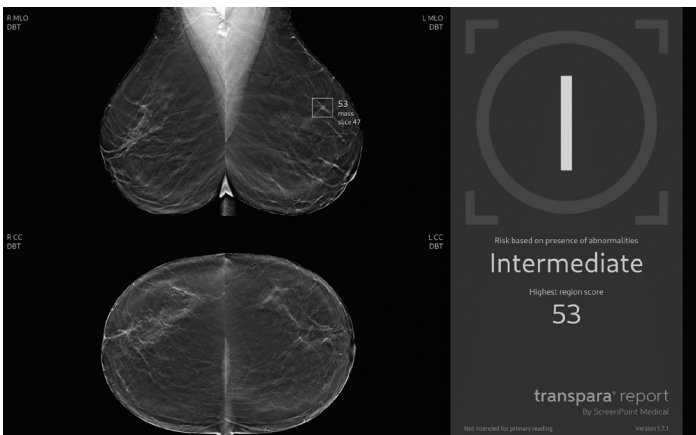


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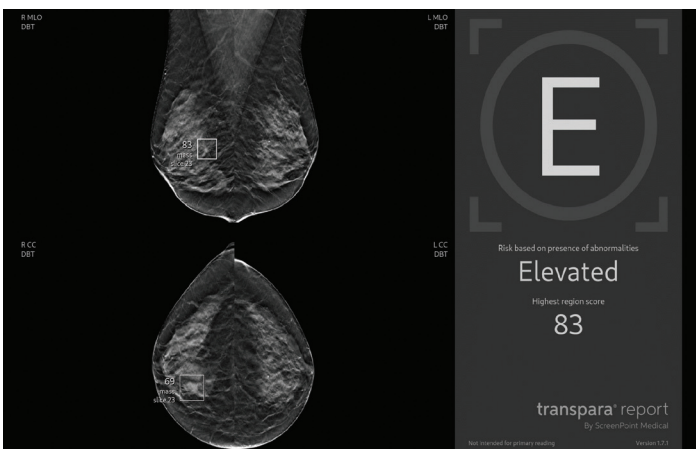
Having a screening mammogram can be an anxiety-provoking experience, especially for women who are “called back” or asked to return for further testing of a potentially abnormal area on their mammogram. “Women often believe that they have something very serious and may die of breast cancer. There’s a lot of fear and anxiety between the time a woman learns that she has an abnormal screening mammogram and her next appointment for further evaluation,” says Anne C. Hoyt, MD, professor of radiology and director of the Santa Monica Women’s Imaging Center. Around 10% of screening mammograms result in a callback; fortunately, about 95% of those are ultimately determined to be false positives, where no breast cancer is found.



Although guidelines vary, all expert organizations, including the American College of Radiology (ACR), agree that annual screening mammography is proven to save lives. The large numbers of women recommended for screening under the various guidelines create the potential for a great deal of stress, albeit usually temporary, when screening mammograms require further evaluation. Dr. Hoyt emphasizes that among screening mammograms determined to be suspicious, “most are false positives and don’t require a biopsy or ultimately show anything worrisome.”



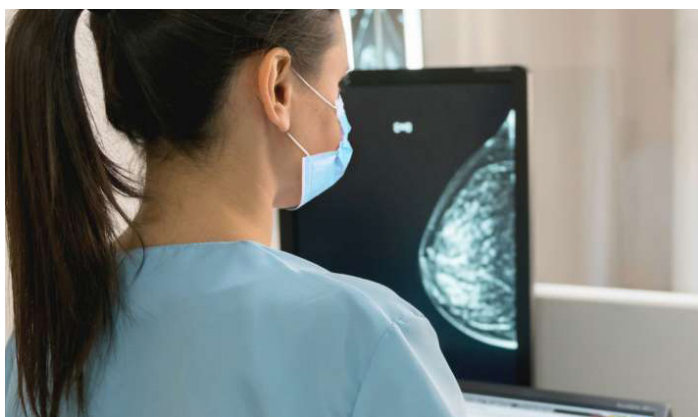
UCLA is currently working under a five-year, \$1 million Phased Innovation Award from the Agency for Healthcare Research and Quality (AHRQ) to develop and implement a workflow that would allow for same-day diagnostic evaluation of women who have abnormal screening mammograms. The team is harnessing artificial intelligence (AI) to streamline the process of reviewing screening mammograms while also taking advantage of AI’s potential to improve diagnostic accuracy. Mammograms flagged as suspicious by the AI algorithm would be read by a radiologist on-site. If the suspicious finding is confirmed, the patient would be offered same-day diagnostic evaluation. Those not flagged as suspicious by the AI would still be confirmed by a radiologist and any deemed to be abnormal would result in a conventional callback diagnostic appointment. The project is one of the first funded under an AHRQ initiative that supports early-stage projects in digital health to encourage translation into clinical implementation.



Beside mitigating the stress associated with waiting for a diagnosis, an additional benefit of offering same-day diagnostic mammography is that it would decrease the risk of losing women to follow-up, which happens for a variety of reasons between screening and diagnostic imaging.

The researchers' goal under the current grant is to get such a same-day center ready to launch clinically and to trial it at UCLA in the near future. However, effectively implementing AI in the clinic is still an open challenge. "While growing published evidence shows that AI improves the efficiency and accuracy of radiologist interpretations, most of these studies are done in the laboratory environment. In this project, we are trying to implement these AI algorithms clinically, which requires anticipating potential issues like when AI makes an occasional mistake," says William Hsu, PhD, professor of radiological sciences and bioengineering, who is a biomedical informaticist affiliated with the Medical & Imaging Informatics group. To anticipate the potential issues of the proposed AI-assisted workflow, UCLA researchers are conducting computer simulations to assess different workflows for screening mammography with same-day diagnostic evaluation, answering such questions as what the staffing needs of such a center would be and how patient wait times would be affected. "There is a perception that AI will work 'out of the box' and all we need to do is install it within our health system," continues Dr. Hsu. "With this project, we are taking a data-driven approach toward understanding how AI can be effectively incorporated into the clinical environment."


The first two years of the grant have supported the planning phase. For example, the investigators wanted to ensure that the AI algorithm used to support the same-day diagnostic exam workflow performed as advertised in UCLA's patient population. UCLA has been evaluating a commercial algorithm already cleared for use by the FDA to read 2D and 3D screening



mammograms. Dr. Hsu notes that, "the AI algorithm was primarily trained on a large cohort of women undergoing screening in Europe, which reflects a different demographic profile than what we see here at UCLA." To validate the algorithm for use at UCLA, the researchers ran a subset of UCLA's own screening mammogram images from the past few years through the algorithm and evaluated its performance. They found that the algorithm performed well, even when judged against the performance of human radiologists. "It didn't necessarily outperform our radiologists — we have very strong specialists and it's really hard to do better than them," explains Dr. Hsu. "But its performance gave us confidence that if we start using this as a triaging tool, it would not substantially increase the number of women who would be erroneously identified as having an abnormal result, which would put a burden on our radiologists who would be making the final determination of whether a same-day diagnostic exam is necessary."

The next three years of the AHRQ grant constitute the implementation phase. During this phase, UCLA researchers will pilot the new workflow with its AI first-pass reading and ultimately ramp up the same-day breast cancer screening and diagnostic service.

While there are a few other centers in the U.S. that offer same-day diagnostic exams following abnormal screening mammograms, they are mostly limited to dedicated clinics serving a relatively small number of patients. By integrating AI into the workflow, the UCLA team hopes to develop a system that can be scaled to one day serve all its breast cancer screening patients.

"As breast imaging radiologists, we see women who are recalled for abnormal mammograms on a daily basis, and the anxiety is truly palpable," says Dr. Hoyt. "From our perspective, the same-day model presents many challenges, especially the unpredictability of how many women might need further evaluation in a given day. However, we have some really exciting, novel ideas about how to manage this unpredictability. At the end of the day, it is about the individual woman's experience and we are willing to think outside of the box to devise a way to make breast cancer screening and diagnosis better for women." 

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